DIVISION
STEP 1 Dividing Fractions by Fractions

Purpose: To divide fractions by fractions

**Materials:**   Fraction Bars, water-base pens, copies of Master #7 on page 119 and Fraction Playing Cards

TEACHER MODELING/STUDENT COMMUNICATION

Activity 1 Dividing a fraction by a fraction using bars

Fraction
Bars

1. Show students and have them find a yellow bar for 2/3 and a red bar for 1/6.

➤ Place the bars under each other to compare their shaded amounts. How many times bigger is the shaded amount for 2/3 than the shaded amount for 1/6? (4 times) Illustrate by drawing lines on bars with water-base pens.
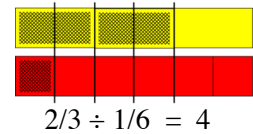
$$2/3 \div 1/6 \ = \ 4$$

pencils
and paper

➤ We can also say the shaded amount of the red bar "fits into" the shaded amount of the yellow bar 4 times. Write the division equation. (2/3 ÷ 1/6 = 4)

2. Show students and have them find a green bar for 1/2 and an orange bar for 1/12.

➤ Demonstrate and explain how many times the shaded amount of 1/12 "fits into" the shaded amount for 1/2 and write the division equation. (It fits in 6 times)

$$1/2 \div 1/12 \ = \ 6$$
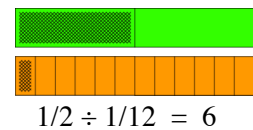
3. Ask students to select an orange bar for 9/12 and a blue bar for 1/4.

➤ Determine the number of times that the shaded amount of the 1/4 bar fits into the shaded amount of the 9/12 bar and write the division equation. (3 times)

$$9/12 \div 1/4 \ = \ 3$$
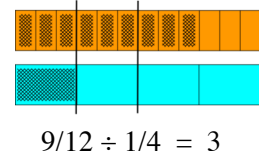
copies of
Master #7

4. Distribute copies of Master #7 "Dividing Fractions from Fraction Bars" on page 119. Discuss their results. Also discuss the meaning of division for comparing two amounts to determine how many times one "fits into" the other. This is an important concept and one that students often do not see when using rules for dividing fractions.

Activity 2 Dividing a fraction by a fraction using reciprocals

1. Have students select any whole bar and any bar with just one part shaded.

Fraction
Bars

➤ The fraction for any whole bar is equal to what number? (1)

➤ How many times will your one shaded part fit into the shaded amount of the whole bar? (6) Write the division equation for the two fractions.
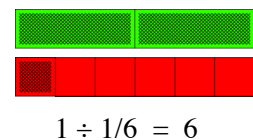
$$1 \div 1/6 \ = \ 6$$

2. List the students' equations from this activity and ask them to look for a pattern.

$$1 \div \frac{1}{6} = 6 \quad 1 \div \frac{1}{4} = 4 \quad 1 \div \frac{1}{12} = 12 \quad 1 \div \frac{1}{2} = 2 \quad 1 \div \frac{1}{3} = 3$$

(When 1 is divided by 1/6, the answer is 6; when 1 is divided by 1/4, the answer is 4; etc.) Students may also note that 1/6 and 6 are reciprocals; 1/4 and 4 are reciprocals; etc.

3. Use the students' equations to demonstrate how their quotients can be computed by **multiplying the first number times the reciprocal of the second number.**

$$1 \div \frac{1}{6} = 1 \times \frac{6}{1} = 6 \quad \text{and} \quad 1 \div \frac{1}{4} = 1 \times \frac{4}{1} = 4$$

4. List the three quotients from using the bars from Activity #1 and ask students to use the reciprocal method to show that they obtain the same results. Two are shown here:

$$\frac{2}{3} \div \frac{1}{6} = \frac{2}{3} \times \frac{6}{1} = \frac{12}{3} = 4 \quad \text{and} \quad \frac{1}{2} \div \frac{1}{12} = \frac{1}{2} \times \frac{12}{1} = \frac{12}{2} = 6$$

**5.** Ask students to use the reciprocal method for computing the following quotients.

$$\frac{7}{8} \div \frac{1}{3} \qquad \frac{3}{4} \div \frac{2}{5} \qquad \frac{7}{10} \div \frac{1}{4} \qquad \frac{5}{6} \div \frac{3}{8}$$

Activity 3 Dividing by fractions from the Fraction Playing Cards

Fraction
Playing
Cards

Place students in pairs. Groups will need decks of Fraction Playing Cards.

➢ Spread the cards face down and select two whose fractions are not equal to zero.

➢ Divide **the larger** fraction by the smaller. Using canceling will reduce the size of the numbers, such as for the fractions on these cards.
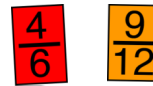
Ask for a show of hands for students' having a quotient greater than 1; greater than 2; greater than 3; etc. Discuss the largest and smallest possible quotients; the largest is 12 and the smallest is 1.

INDEPENDENT PRACTICE and ASSESSMENT

Worksheets 84-86 from the *Teacher Resource Package*

fractionbars.com Set 1 **Greater Quotients Game** (Quotients from playing cards)